

APPENDIX II

PROCESS NOTES FOR CREATING BASE YEAR GRIDDED POPULATION SURROGATE

1/27/00

Creating 2 km gridded population from MPO traffic analysis zones.

Current location: /trinidad/uam_aero/ws.uamaero/ws.pop/shapes

Shape files for WFRC taz and pop have already been converted and are in the coverage:

Workspace: /TRINIDAD/UAM_AERO/WS.UAMAERO/WS.POP/WFRC_96TAZ

Now will convert the shapefiles from MAG. These are the 96 population with updated TAZ boundaries for 2000.

Arc: shapearc taz2000 mag_96taz type

Arc: clean mag_96taz

Arc: regionpoly mag_96taz mag_96taz2 type mag_96taz2.safe

Arc: killem MAG_96TAZ

Arc: rename MAG_96TAZ2 MAG_96TAZ

Drop some items from both of the TAZ coverages now.

Current location: /trinidad/uam_aero/ws.uamaero/ws.pop

join the population to the mag data set

Arc: tables

Enter Command: define mag.join2

Did the define

Enter Command: sel MAG.JOIN2

Enter Command: add from mag96pop.csv

Enter Command: q

2/1/00 Continuing where I left off

Arc: joinitem MAG_96TAZ.PAT MAG.JOIN2 MAG_96TAZ.PAT taz99

Now do a QC to see if things look like they should.

Things are a mess. To fix them I got rid of some sliver polygons. Now I am fixing it this way.

Enter Command: copy MAG.JOIN2 MAG.JOIN3 nodata

Enter Command: sel MAG.JOIN3

Enter Command: add from mag96pop.csv

Enter Command: q

Arc: dropitem MAG_96TAZ.pat MAG_96TAZ.pat Z6_POP

Arc: clean MAG_96TAZ

Arc: joinitem MAG_96TAZ.pat MAG.JOIN3 MAG_96TAZ.pat taz99

Now QC it again. QA carried out. Things look good. The numbers in the TAZ and the total numbers match those in the shape file and the excel file. Now it is on to putting in the population in the outlying counties.

2/2/00

Workspace: /TRINIDAD/UAM_AERO/WS.UAMAERO/WS.POP

Arc: copy ../AERO3_CORP ../AERO3_CORP

Arc: additem AERO3_CORP.pat AERO3_CORP.pat pop96 5 5 i

First thing I will do is to put the population into each town's polygons. Population data comes from GOPB. It is in the file file: /trinidad/uam_aero/ws.uamaero/ws.pop/pop.sdc.

This file was created from data take from:

<http://www.governor.state.ut.us/dea/Profiles/Data/data.html>. From there go to 1990-1998 City Population Estimates - Data Source: Bureau of the Census.

The process will be to simply select a polygon in ae, find out its name, look up the population from the file and then enter that value in the pop96 item.

Next thing is to grid the population from the WFRC + MAG + the cities. After that is done I have to grid up the population in the outlying counties outside of the town boundaries.

Will grid these up at 25 m resolution to start. These will be huge grids which will be eliminated as they are retired.

First get an item of population per 625 sq m. (25 x 25 meter cell)

Arc: additem MAG_96TAZ.pat MAG_96TAZ.pat pop625sqm 8 8 f 3

Arc: additem WFRC_96TAZ.pat WFRC_96TAZ.pat pop625sqm 8 8 f 3

Arc: additem AERO3_CORP.pat AERO3_CORP.pat pop625sqm 8 8 f 3

Arc: tables

Enter Command: sel MAG_96TAZ.pat

Enter Command: calc pop625sqm = z6_pop / (area / 625)

Enter Command: sel WFRC_96TAZ.pat

Enter Command: calc pop625sqm = Z6__POP / (area / 625)

Enter Command: sel AERO3_CORP.pat

Enter Command: calc pop625sqm = POP96 / (area / 625)

Did a QA check and this method looks fine.

Now Grid these up

Arc: polygrid MAG_96TAZ mag25m_grd POP625SQM

Cell Size (square cell): 25

Arc: polygrid WFRC_96TAZ wfrc25m_grd POP625SQM

Cell Size (square cell): 25

Arc: polygrid AERO3_CORP corp25m_grd POP625SQM

Cell Size (square cell): 25

Go into grid; sum up and resample to 2km. Instead of a block sum on this one I will use a zonal sum so that I sum things up in the aero 2km cells (they will be the zones).

Create a zone grid

Arc: polygrid POP96_2KM zone_2km cell-id

Cell Size (square cell): 2000

Number of Rows = 113

Number of Columns = 67

grid

Grid: setcell minof

Grid: CORP25M_sum = zonalsum (ZONE_2KM,CORP25M_GRD)

Grid: MAG25M_sum = zonalsum (ZONE_2KM,MAG25M_GRD)

Grid: WFRC25M_SUM = zonalsum(ZONE_2KM,WFRC25M_GRD)

Now resample

Grid: CORP25M_rsmp = resample (CORP25M_SUM,2000)

Grid: WFRC25M_rsmp = resample (WFRC25M_SUM,2000)

Grid: MAG25M_rsmp = resample (MAG25M_SUM,2000)

Due QA. So far looks real good. Looked at the 6 cells containing Morgan city and the pop values came out almost exactly to the GOPB data for Morgan.

Grid: CORP25M_int = int(CORP25M_RSMP)

Grid: MAG25M_int = int(MAG25M_RSMP)

Grid: WFRC25M_int = int(WFRC25M_RSMP)

Grid: corp2km_pop = gridpoly(CORP25M_INT)

Grid: mag2km_pop = gridpoly(MAG25M_INT)

Grid: wfrc2km_POP = GRIdpoly(WFRC25M_INT)

q

QA was done and things still look right. One or two more steps left.

Arc: copy ../AERO3_2KM ./pop96_2km

Arc: identity POP96_2KM CORP2KM_POP aPOP96_2KM

ae;ec aPOP96_2KM ;ef poly;de poly;bc AERO3_CORP 6;be arc;draw

Arccedit: sel all

Arccedit: resel grid-code = -9999

Arccedit: calc grid-code = 0

Did a QA selection and these look quite close - the differences are in rounding errors.

Enter Command: sel APOP96_2KM.pat

Enter Command: alter grid-code

Item Name: outlypop

2/3/00

Had some problems with mag and wfrc data. Believe have them fixed. The methods above work to this point.

Arc: identity POP96_2KM MAG2KM_POP bPOP96_2KM

Arc: ae;ec BPOP96_2KM;ef poly;de poly;bc MAG_96TAZ 6;be arc;draw

Arcedit: sel all

Arcedit: resel grid-code = -9999

Arcedit: calc grid-code = 0

Arcedit: save

Arcedit: q

Do a QA in ap to see if the gridded population matches the TAZ polygon population.

Record FREQUENCY SUM-Z6_POP

1 344 321086.000000

Record FREQUENCY SUM-GRID-CODE

1 903 319945.000000

This is less than 1% off for the total Utah county pop. Sample at the TAZ level in ae using a somewhat coarse method of getting the population of 1 grid cell then comparing that to the population in the TAZ which are included in the grid cell. This looks right. It is not exact because some of the TAZ polys are outside of the grid cell, but by doing a visual guess at the area outside the cell and the difference in population it looks right.

Arc: identity POP96_2KM WFRC2KM_POP cPOP96_2KM

Arc: ae;ec cPOP96_2KM;ef poly;de poly;bc WFRC_96TAZ 6;be arc;draw

Arcedit: sel all

Arcedit: resel grid-code = -9999

Arcedit: calc grid-code = 0

Arcedit: save

Complete the QA

Record FREQUENCY SUM-GRID-CODE

1 548 1240035.000000

Record FREQUENCY SUM-Z6__POP

1 704 1240432.000000

Excellent match for the total. One cell looks good too. So now on to the final steps.

Enter Command: sel BPOP96_2KM.pat

Enter Command: alter grid-code

Item Name: magpop

Enter Command: sel CPOP96_2KM.pat

Enter Command: alter grid-code
Item Name: wfrcpop

Now identify each of these with POP96_2KM to get the final cell-based population coverage.

Arc: identity POP96_2KM APOP96_2KM POP96_2KM2
Arc: identity POP96_2KM2 BPOP96_2KM POP96_2KM3
Arc: identity POP96_2KM3 CPOP96_2KM POP96_2KM4

Now drop all of the superfluous items
Check to be sure that if one of the 3 pop items has a value in it, the other 2 contain 0's.
There is are a dozen or so that overlap, but that should be along the border and that should be ok.

Before I combine these I am going to factor them so that the numbers from each data set match exactly (in total) to this final coverage.

Outlying pop is only off by 88. I am leaving it.

Enter Command: sel MAG_96TAZ.PAT
Record FREQUENCY SUM-Z6_POP
1 363 321086.000000
Enter Command: sel POP96_2KM4.PAT
Record FREQUENCY SUM-MAGPOP
1 903 319945.000000
Enter Command: calc magpop = magpop * (321086 / 319945)
Record FREQUENCY SUM-MAGPOP
1 903 320968.000000

Enter Command: sel WFRC_96TAZ.PAT
Record FREQUENCY SUM-Z6_POP
1 752 1240432.000000
Enter Command: sel POP96_2KM4.PAT
Enter Command: resel wfrcpop > 0
Record FREQUENCY SUM-WFRCPOP
1 548 1240035.000000
CLOSE ENOUGH!

Arc: additem POP96_2KM4.pat POP96_2KM4.pat pop96 4 8 b

Enter Command: sel POP96_2KM4.pat
Enter Command: calc pop96 = OUTLYPOP + MAGPOP + WFRCPOP

Record FREQUENCY SUM-POP96
1 7572 1642574.000000

$81659 + 321086 + 1240432 = 1643177$

Close enough!

Now get rid of all of the intermediate coverages and grids.

Arc: rename POP96_2KM4 POP96_2KM

Still need to get the remainder populations in each county distributed into the grid cells.

The method is going to be this:

From the GOPB data, proportion the "balance of county" population by the land area of the county inside the domain. For example, Box Elder has 22% of it's land area in the domain. Its balance of population is 7,887. So, $7887 * .22 = 1,735$. Those get evenly divided in cells outside the town.

Additional cells in each county which will not receive population will be those in the lake and those above 6,500 feet (1,981 meters) elevation.

Here we go

Arc: copy POP96_2KM bal_pop

Drop extra items

Arc: copy ../ELEV_2KM ./elev_65

\$\$

Change of plans here. The eastern counties have most of there area above 6,500. So I reselected on the eastern counties and then deleted cells < 7,500 ft. This will be my erase coverage for elevation.

Arcedit: additem elev 1 1 i

Arcedit: sel all

Arcedit: calc elev = 1

Arc: additem BAL_POP.pat BAL_POP.pat outlybal 4 8 b

Arc: additem BAL_POP.pat BAL_POP.pat lake 1 1 i

I am going to overlay the lake and put in the lake cells by hand. Included Promontory Pt. As a masked out area for population.

Arc: identity BAL_POP ELEV_65 BAL_POP2

This looks good I have an elev = 1 in just the cells that they should be.

Arc: identity BAL_POP2 POP96_2KM BAL_POP3

Look at it in ae ; see if it looks right. Looks good.

Now get rid of all the items in BAL_POP3 except lake , elev, and outlypop. These will be the ones where population does not go.

Now put the remainder population in bal_pop3

Arc: ae;ec BAL_POP3;ef poly;de poly;draw

Arcedit: sel fips = 3

970 element(s) now selected
Arcedit: resel lake = 0 and elev = 0 and outlypop = 0
339 element(s) now selected
Arcedit: calc OUTLYBAL = 1748 / 339

Arcedit: sel fips = 5
313 element(s) now selected
Arcedit: resel lake = 0 and elev = 0 and outlypop = 0
173 element(s) now selected
Arcedit: calc OUTLYBAL = 2357 / 173

Arcedit: sel fips = 23
698 element(s) now selected
Arcedit: resel lake = 0 and elev = 0 and outlypop = 0
562 element(s) now selected
Not gonna waste my time since the balance pop is only 267

Arcedit: sel fips = 29
388 element(s) now selected
Arcedit: resel lake = 0 and elev = 0 and outlypop = 0
272 element(s) now selected
Arcedit: calc OUTLYBAL = 4378 / 272

Arcedit: sel fips = 33
205 element(s) now selected
Arcedit: resel lake = 0 and elev = 0 and outlypop = 0
127 element(s) now selected
Arcedit: calc OUTLYBAL = 198 / 127

Arcedit: sel fips = 39
153 element(s) now selected
Arcedit: resel lake = 0 and elev = 0 and outlypop = 0
80 element(s) now selected
Arcedit: calc OUTLYBAL = 414 / 80

Arcedit: sel fips = 43
390 element(s) now selected
Arcedit: resel lake = 0 and elev = 0 and outlypop = 0
302 element(s) now selected
Arcedit: calc OUTLYBAL = 4463 / 302

Arcedit: sel fips = 45
1494 element(s) now selected
Arcedit: resel lake = 0 and elev = 0 and outlypop = 0
1148 element(s) now selected
Arcedit: calc OUTLYBAL = 2416 / 1148

Arcedit: sel fips = 51
286 element(s) now selected
Arcedit: resel lake = 0 and elev = 0 and outlypop = 0
141 element(s) now selected
Arcedit: calc OUTLYBAL = 1463 / 141
Arcedit: save

Make the final final cov.
Arc: identity POP96_2KM BAL_POP3 POP96_2KM2
Drop items
Enter Command: sel POP96_2KM2.pat
Enter Command: calc pop96 = pop96 + outlybal
Record FREQUENCY SUM-POP96
1 7572 1659331.000000
This looks right. Close enough anyway. It added about another 17 or 18 K.

Kill the unneeded covs.
Arc: rename POP96_2KM2 POP96_2KM

2/4/00

Have some population in the lake in Tooele Co. Need to get it out. Going to do it by hand.
Reselect the cells in the lake count up how much pop is in there. Probably less than 100,
I would bet. Will calc those values to 0 and then divide that pop into the other cells in
Tooele.

Arc: ae;ec POP96_2KM;ef poly;de poly;draw
Arcedit: bc ../LAKES_3 6;be arc;draw
Arcedit: bc ../STATE_CLP3 4;draw
Arcedit: asel many
Statistics: end
Record FREQUENCY SUM-OUTLYBAL
1 220 356.000000
Arcedit: calc OUTLYBAL = 0
Arcedit: calc pop96 = 0
Arcedit: sel fips = 45
1494 element(s) now selected
Arcedit: resel outlybal > 0
970 element(s) now selected
Record FREQUENCY SUM-OUTLYBAL
1 970 1940.000000
calc outlybal = (outlybal + (356 / 970))
Do you want to use them (Y/N)? y
Record FREQUENCY SUM-OUTLYBAL
1 970 1940.000000

Didn't change the totals because of the rounding. Just as well.
Arcedit: save
Arcedit: q

Process for 1996 completed.